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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,141	04/01/2004	Heung-Lyul Cho	0630-1979P	6546

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BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/814,141

Applicant(s)

CHO ET AL.

Examiner

Andrew Schechter

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 5-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1. ☒ Certified copies of the priority documents have been received.
 - 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5/9/06
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 24 April 2006 have been fully considered but they are not persuasive.

The applicant argues [pp. 12-13] that "the Examiner is asserting that using masking (or a single mask) to pattern the photoresist is inherent in Holmberg". This is unpersuasive, since the examiner made no such assertion. The examiner recognized that it is theoretically possible for *Holmberg's* method not to include "applying a mask", so the examiner did not assert that this was inherent; rather he argued that "applying a mask" was well-known in the art and would have been obvious to one of ordinary skill in the art at the time of the invention, motivated by the conventionality of doing so, with advantages of high patterning precision and reliability.

The applicant argues [p. 13] that "the Examiner fails to provide evidence of mask use but asserts that this is well known in the art". Although the applicant did not properly traverse the official notice, in order to expedite prosecution this statement will be interpreted as a traversal of the examiner's taking of official notice that "applying a mask of some kind to pattern the photoresist layer in question is well-known in the art". The examiner therefore supplies an additional reference in the rejections below in order to provide evidence of such mask use in the art.

The applicant argues [pp. 13-14] that "high patterning precision" is "not a motivating factor in the present invention". This is not persuasive for two reasons. First, the applicant's own quotation of paragraph 0098 states that

"a printing method, having less minuteness but easy processing, is applied at the time of forming a pattern of a wider effective line width. A lithography process using a mask is applied at the time of forming a minute part such as the channel region with a narrow effective line width". (Emphasis added.)

Thus, high patterning precision is clearly a motivating factor for the use of a mask in the present invention. Second, regardless of what motivated the present inventors, the motivations supplied by the rejection are appropriate if they would motivate one of ordinary skill to modify the applied references as stated, which they would.

The previous rejections are therefore repeated below, modified as necessary by the addition of claim 15 and the traversal of the examiner's taking of official notice.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Holmberg et al.*, U.S. Patent No. 6,160,270 in view of *Yudasaka et al.*, U.S. Patent No. 5,989,945, and further in view of *Mori et al.*, U.S. Patent No. 5,668,650.

Holmberg discloses [see Fig. 6, for instance] a fabrication method of an LCD, comprising forming a gate line [132, etc.] on a substrate [122] by applying a gate photoresist pattern [130]; sequentially forming a gate insulating layer [138], a semiconductor layer [140], and a high-concentrated N+ layer [142] over the gate line; forming an active region over the high-concentrated N+ layer by applying an active photoresist pattern [144]; forming a conductive layer [152, 154] over the active region; depositing a photoresist layer [150] over the conductive layer; applying a mask over the photoresist layer, performing a lithography process, and thereby forming a source/drain electrode [152, 154] [Fig. 6J]; forming a passivation layer [160] over the source/drain electrode; forming a contact hole [164] over the passivation layer by applying a contact hole photoresist pattern [162]; and forming a pixel electrode [168] on the passivation layer by depositing a pixel electrode photoresist pattern [170].

It might be argued that *Holmberg* does not disclose the step of "applying a mask", since it does not use the term "mask" and merely discloses that the photoresist layer is "patterned" [col. 10, lines 56ff.]. (One of ordinary skill in the art would presume a mask of some kind is used, but this is perhaps not made explicit in the reference.) The examiner takes official notice that applying a mask of some kind to pattern the photoresist layer in question is well-known in the art, and it would have been obvious to one of ordinary skill in the art at the time of the invention to do so in this case, motivated by the conventionality of doing so, with advantages of high patterning precision and reliability.

In response to the applicant's traversal of this taking of official notice, the examiner supplies *Mori*, which discloses [see Fig. 3B, col. 8, line 62 – col. 9, line 11] applying a mask [col. 8, line 67] over the analogous photoresist layer, performing a lithography process, and thereby forming source/drain electrodes. This evidences that doing so is well known in the art, as previously stated by the examiner.

Holmberg does not disclose that the other photoresist patterns are formed by printing. *Yudasaka* does disclose [col. 19, lines 47ff.] forming such photoresist patterns by ink jet printing, and teaches that using doing "increases utilization of the solution and permits forming a patterned coating film ...[and] drastically reduces initial investment and production cost of a liquid crystal display device" [abstract]. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use ink jet printing to form the gate photoresist pattern, the active photoresist pattern, the contact hole photoresist pattern, and the pixel electrode photoresist pattern. Claim 1 is therefore unpatentable.

The mask includes a channel region pattern [see Fig. 6J], so claim 2 is also unpatentable. The printing is ink jet printing, so claim 3 is also unpatentable. The step of forming the source/drain electrode comprises defining an active layer by sequentially removing the N+ layer and the semiconductor layer by using the active photoresist pattern formed by printing as a mask [Fig. 6F]; removing the active photoresist pattern [Fig. 6G]; sequentially forming a conductive layer [152] and a photoresist layer [150] over the active layer [Fig. 6J]; exposing the photoresist layer, performing a development process, and thereby removing the photoresist layer above a channel region by using

the mask including the channel region pattern [Fig. 6J – see discussion of “applying a mask” above]; and sequentially removing the conductive layer and the N+ layer above the channel region [Figs. 6J-6L]. Claim 4 is therefore unpatentable as well. In the step of applying mask over the photoresist layer, only one mask is used [for instance, see *Mori*’s description of “a mask”, col. 8, line 67]. Claim 15 is therefore unpatentable as well.

To clarify one issue regarding the term “masks”: The present invention puts down patterned photoresist layers and etches away the material beneath them, leaving the material in the shape of the patterned photoresist layers. This patterned photoresist is conventionally referred to as a “mask”, including in this specification [paragraph 0048, “using the photoresist 306 as a mask”]. However, the term “mask” in the claims only refers to the exposure masks which are used to make the photoresist patterns themselves. Thus, since all the patterned photoresists are put down by a printing method, without an exposure patterning, except in the case of the patterned photoresist 311 for the source/drain electrodes, it is correct to say that only a single mask is used in the invention [as stated in paragraph 0048].

Claim 15 only recites there being only a single mask in the step of applying a mask over a photoresist layer, which is met by the prior art. The more stringent requirement that only a single mask is used in the entire process is also met by the combination of *Holmberg* and *Yudasaka*.

Election/Restrictions

4. Claims 5-14 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Group, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 6 January 2006.

Conclusion

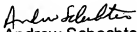
5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Nelms can be reached at (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
Primary Examiner
Technology Center 2800
6 July 2006